System Design

Good Data Model Characteristics

- Model simplicity
  It should describe only the entity that is intende
  & descrition
- Model non-redundancy
  It should not include duplicated data (attributes)
  in the level of the one entity
- Model flexibility and adaptability for future need
  It should fit for future use in both horizontall
  and vertically without redesigning the model

Course reg. #	Course reg. date	student #	student name	Course 1 #	Course 1 name	Course 2 #	Course 2 name	...	[illegible]

Course reg. #	Course reg. date	St. std #

std #	student name	student major

std. course #	Course year [illegible]

Student #	Course #	Course name

Course prerequest	- - -

Integrity Constraints

* They are the rules that govern changing and deleting records and help keep the data in the database accurate.
* Integrity Constraints is enforced using a set of integrity rules.
* Data integrity rules provides necessary Controls upon the database. to insure data integrity
* There are Three types of data integrity rules, they are :-
  - Key integrity
  - Domain integrity
  - Referencial integrity
* The integrity rules should be designed and implemented if it is not yet an inherent feature in used database package.
* Key integrity :-
  - Every table should have primary key (may be Concatinated)
  - Primary key should not be repeated in two records in the same table
  - Primary key should not be assigned, a null value
* Domain integrity :-
  - Appropriate Control should be assigned to insure

- that no one attribute has taken on avalue that is outside the allowed domain for that attribute values.
  Ex: for student grade, it should take values between 1 and 5
  So, the values greater than 5 should be rejected.

* Referential integrity:-
  - the relational DB architecture implements a relationship between tables via foreign keys.
  - The use of foreign keys increase the flexability of any database, but it also increase the risk of referential integrity errors.
  - Referential integrity error exists when a foriegn key value in one table has no matching primary key in the related table.
  - When deleting a record from a table, all the related records in other tables should be deleted also.
  - Referential integrity errors can be prevented by applying one of following ways:-
    → Any record in the ~~record~~ table may be deleted without regard to any other table, which may lead to accuracy problems.
    → Any record deleted in one table must be automatically followed by the deletion of all matched records in the related tables
    → Disallowing deleting any record in a table, unless all related ~~tables~~ records in all other tables

have been deleted.

→ A deletion of arecord in atable must be automatically followed by setting any matched Keys in all related table to the null value. By setting the foreign Key to null, You are acknowlenge that the record does not point back to a corresponding master record.

Program Design :-

- * Computarized information System may Consist of one or more application
- * Each application may Consist of one or more programs linked together by some sort of interface.
- * Generally, information System should start by the log in screens, to allow user entering user name and password.
- * log in screen enforce the access rights rules to prohibit any unauthorized access to the system
- * Each program Should be designed, then described, by stating the following :-
  - → program name
  - → programming technology employed
  - → The modules Constituting this program with their names, interfaces between individual module, input for each module, output generated by each module and tests processing done inside each module,

related to each module.

→ Name and description of the related database.

* various types of tests should be described, they can be :-
  - → Module verification tests
  - → Integration tests
  - → functional tests
  - → Performance tests
  - → Installation tests
  - → Acceptance tests

* for each Type of tests the following decumentation is Prepared :-
  - → List of tests (test code, name, prife description)
  - → Test description (test code, name, description, execution steps, and expected result for each test)
  - → Test report to register the status of executing The test

* Information System is supported by data base, which should be always up-to-date.

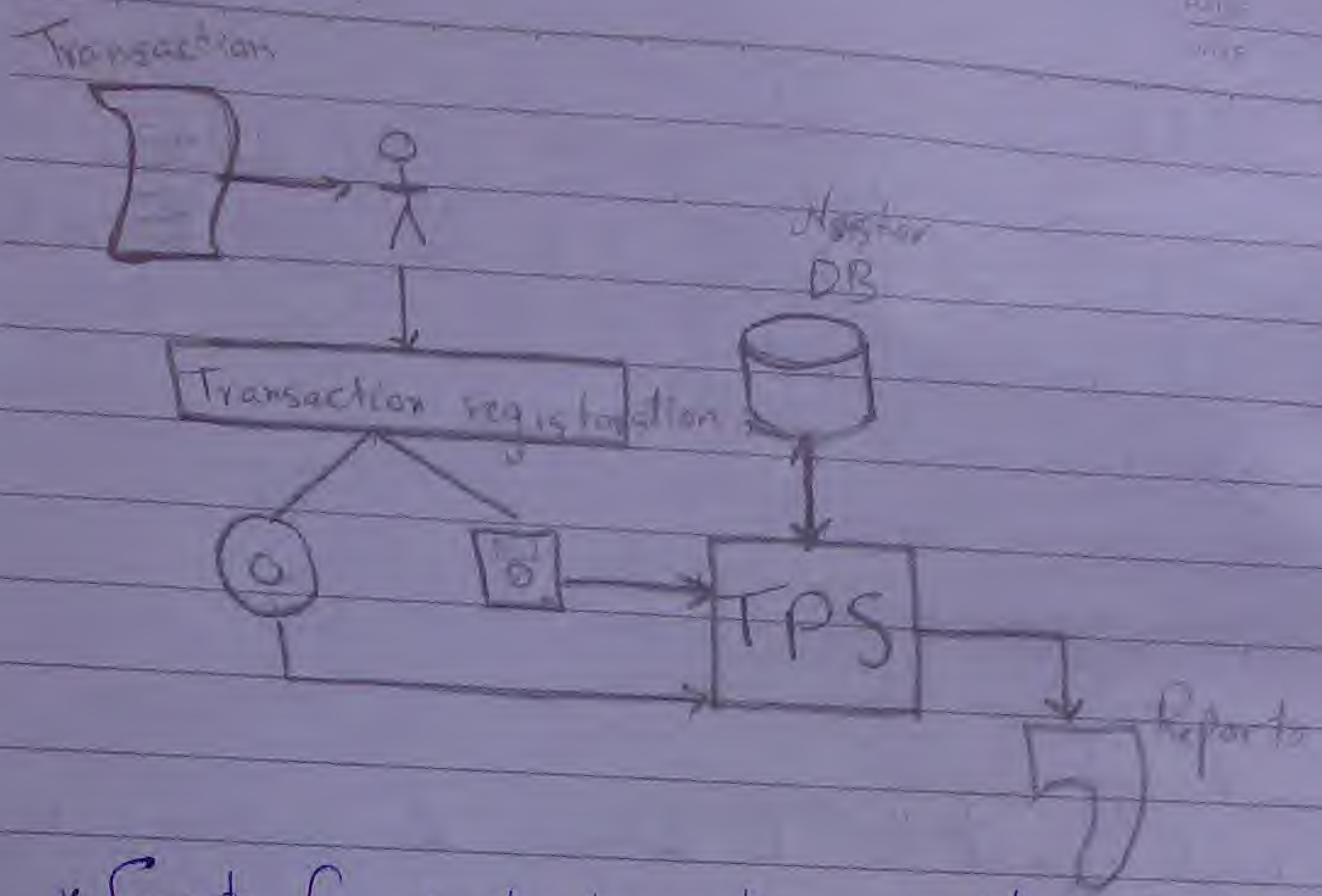
* To keep database alwayse up-to-date, it should be updated Continuously transactions

* Database that are not up-to-date is obselete.

* Database transactions are designed to update various attributes in database.

* Transaction Can be processed in one of two modes :-
  - Batch transaction Processing

→

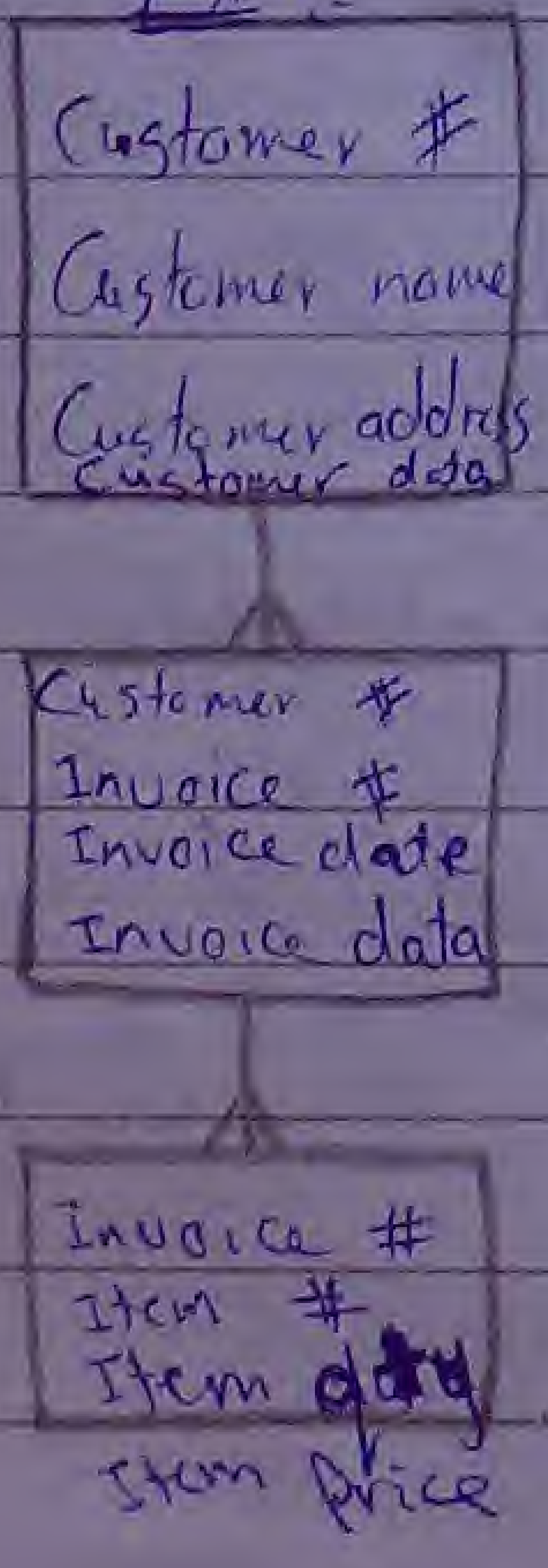


* Formate for each transaction should be stated
* Transaction ~~id~~ ~~number~~ Format Can be :-

→*→Transaction type
→*→Transaction data
→*→Transaction id number

* Transaction data depends on the transaction type :

Ex :-



Needing to update :
* Customer address
* " data
* " invoice data
* Invoice item qty
* Invoice itemprice

* This means we have 4 transaction types *

* format of each transaction Can be :-

Transaction Type	Trans. Id #	Trans. data
1 →	Customer # →	Cust addr
2 →	Customer # →	" data
3 →	Customer/invoice # →	inv. data
4 →	Invoice/item →	Item qty
5 →	invoice/item →	Itemprice